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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/837,102	04/18/2001	Hideo Nobuhara	13409.3US01	9004
23552	7590	03/30/2004	EXAMINER	
MERCHANT & GOULD PC P.O. BOX 2903 MINNEAPOLIS, MN 55402-0903			BOYD, JENNIFER A	
			ART UNIT	PAPER NUMBER
			1771	

DATE MAILED: 03/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/837,102

Applicant(s)

NOBUHARA ET AL.

Examiner

Jennifer A Boyd

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 2 - 10, 12 and 14 - 28 is/are pending in the application.
- 4a) Of the above claim(s) 16 and 17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2 - 10, 12, 14 - 15 and 18 - 28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

1. The Applicant's Amendments and Accompanying Remarks, filed January 2, 2004, have been entered and have been carefully considered. Claims 3, 5 - 10, 12 and 14 - 15 are amended, claims 18 - 28 are added, claims 16 - 17 are withdrawn, claims 1, 11 and 13 are cancelled and claims 2 - 10, 12, 14 - 15 and 18 - 28 are pending. In view of Applicant's Arguments, the Examiner withdraws all previously set forth rejections as detailed in paragraphs 3 - 5 of the previous Office Action dated May 30, 2003. However, after an updated search, the invention as currently claimed is not found to be patentable for reasons herein below.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 18 and 28 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way to reasonably convey to one skilled in the relevant art that the inventor(s), as the time the application was filed, has possession of the claimed invention. The phrase "the fiber intersections of the non-woven fabric strip are not resin-bonded" is new matter, because this negative limitation is not literally

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supported by the specification. *Ex Parte Grasselli*, 231 USPQ 393. Contrary to the applicant's statement in the present response, this limitation is not supported by the specification. There is no mention of "not being resin-bonded" in the specification. It is mentioned that that a trace of added surfactant can create an adverse effect (page 2, lines 16 – 27) and that, in one embodiment, the fiber intersections are thermally compressed by means of a heat embossing roll (page 9, lines 15 – 20). However, this does not exclude the use of resin to bond the intersecting points.

***Claim Rejections - 35 USC § 103***

5. Claims 2 – 4, 6 – 8, 10, 12, 14 – 15, 20 – 22 and 24 - 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakikubo (JP 5-2715U) and Wada (EP 313,920).

As to claim 2, Sakikubo discloses a strip of a nonwoven including a thermoplastic fiber obtained by bonding the fiber intersections and winding the strip on a porous core-cylinder (sections [0005 – 0007]). Sakikubo teaches that the nonwoven strip is made by carding. It should be noted that "carding" traditionally is used to align fibers within a nonwoven, thus creating Applicant's "direction aligned" fibers.

As to claims 14 – 15 and 26 - 27, Sakikubo teaches that the fiber comprises a composite fiber which can contain various types of polymers such as polyethylene, polypropylene, nylon, polyester, etc (section [0007]) which would inherently have a melting point difference of 10 degrees Celsius or more.

As to claims 12 and 25, Sakikubo teaches that the nonwoven fabric can be made by the card method, cross layer method, random weber method, wet paper-making method, dry type or wet type heat attaching method, needle-punch method or a high-tension liquid flow method

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among other methods (section [0008]). It is the position of the Examiner that dry type heat attaching method would be equivalent to spunbonding.

As to claim 2, Sakikubo fails to teach that the strip is arranged in a twill form.

Wada discloses the concept of winding a filter media in a twill form (see FIG. 3) and suggests that such a configuration prevents deformation of the media due to fluid pressure thereby enabling efficient removal of particles (see lines 25-33 of col. 6).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to wrap the nonwoven strip of Sakikubo in a twill form as suggested by Wada motivated by the desire to increase the filtration efficiency of the apparatus.

As to claim 2, although Sakikubo in view of Wada does not explicitly teach that the claimed nonwoven strip satisfies the following equation:  $(\log_{10} Y) < 3.75 - 0.75 (\log_{10} X)$  where X is the airflow amount and Y is the basis weight, it is reasonable to presume that nonwoven strip satisfies the following equation:  $(\log_{10} Y) < 3.75 - 0.75 (\log_{10} X)$  where X is the airflow amount and Y is the basis weight is inherent to Sakikubo in view of Wada. Support for said presumption is found in the use of like materials (i.e. thermoplastic nonwoven wound around a perforated cylinder) which would result in the claimed property. The burden is upon the Applicant to prove otherwise. *In re Fitzgerald* 205 USPQ 594. In addition, the presently claimed nonwoven which satisfies the following equation:  $(\log_{10} Y) < 3.75 - 0.75 (\log_{10} X)$  as required by claim 2 where X is the airflow amount and Y is the basis weight would obviously have been present once the Sakikubo in view of Wada product is provided. Note *In re Best*, 195 USPQ at 433, footnote 4 (CCPA 1977).

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As to claims 3 – 4, 6 – 8, 10, 20 – 22, 24 Sakikubo in view of Wada fails to teach that the number of windings of the nonwoven fabric strip from one end to another end in a longitudinal direction of the perforated cylinder is one to 10 per length of 250 mm in the perforated cylinder as required by claim 3, the 2-fold value of the winding number is represented by a fraction having a denominator of two figures or less which is a non-reducible approximate value, the denominator is 4 to 40 as required by claim 4, the strip has a width of 0.5 to 40 cm as required by claims 6 and 20, the product of the width and basis weight is 10 to 200 as required by claims 7 and 21, the strip has a thickness of 0.02 to 1.20 mm as required by claims 8 and 22 and the filter has a void rate of 65 – 85% as required by claims 10 and 24. It should be noted that the number of windings, 2-fold value of the winding number, width, basis weight, thickness and void rate are result effective variables. As the number of windings increase and fraction, the filter will more efficiently filtrate mediums containing fine particles. As the width increases, the strip has more coverage area while thinner strip allow more fine tuning in filtration capabilities. As the void rate increases, the filtration properties change. It would have been obvious to one having ordinary skill in the art at the time the invention was create a filter with the number of windings of the nonwoven fabric strip from one end to another end in a longitudinal direction of the perforated cylinder is one to 10 per length of 250 mm in the perforated cylinder as required by claim 3, the 2-fold value of the winding number is represented by a fraction having a denominator of two figures or less which is a non-reducible approximate value, the denominator is 4 to 40 as required by claim 4, the strip has a width of 0.5 to 40 cm as required by claims 6 and 20, the product of the width and basis weight is 10 to 200 as required by claims 7 and 21, the strip has a thickness of 0.02 to 1.20 mm as required by claims 8 and 22 and the filter has a void rate of 65 –

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85% as required by claims 10 and 24 since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In the present invention, one would have been motivated to optimize the number of windings, 2-fold value of the winding number, width, basis weight, thickness and void rate to create a properly efficient filter depending on type of particle being filtrated.

6. Claims 5, 18 - 19 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakikubo (JP 5-2715U) in view of Wada (EP 313,920) and, in further view of Pike et al (US 6,090,731) as applied above.

Sakikubo in view of Wada teaches the claimed invention above but fails to teach the strip can be thermally bonded together as required by claims 5, 18, 19 and 28.

Pike discloses a thermoplastic filament nonwoven obtained by thermal bonding of at least part of the fiber intersections (Example 1, columns 10 - 11) and suggests that such an arrangement has high filtration efficiency and physical strength (column 3, lines 17 - 22).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to thermally bond as suggested by Pike the intersection points of Sakikubo in view of Wada motivated by the desire to provide a filtration material having high filtration efficiency and physical strength.

7. Claims 9 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakikubo (JP 5-2715U) in view of Wada (EP 313,920) and further in view of Ogata (EP 466381 A1) as applied above.

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Sakikubo in view of Wada teaches the claimed invention except fails to disclose that the strips can be thermally bonded together by means of a heat embossing roll.

Ogata teaches a precision cartridge filter comprising a web composed of conjugate microfibers which is heated and molded to the shape of a cartridge filter (Abstract). The heating process can involve a heat embossing process (column 4, lines 48 – 53).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to thermally bond the nonwoven strips together such as by embossing as suggested by Ogata in the filter of Sakikubo in view of Wada motivated by the desire to create a more cost efficient process by eliminating the need for a separate adhesive component.

Sakikubo in view of Wada and Ogata discloses the claimed invention except for an embossing area rate of 5 to 25%. It should be noted that the area embossing rate is a result effective variable. For example, as the area embossing rate increases, the bonding strength increases. It would have been obvious to one having ordinary skill in the art at the time the invention was made to thermally compress an area with an embossing area rate of 5 to 25% since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In the present invention, one would have been motivated to optimize the bonding area rate to create a strong bond.



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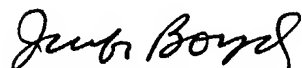
*Response to Arguments*

8. Applicant's arguments with respect to claims 2 – 10, 12, 14 – 15 and 18 - 28 have been considered but are moot in view of the new ground(s) of rejection.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A Boyd whose telephone number is 571-272-1473. The examiner can normally be reached on Monday thru Friday (8:30am - 6:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on 571-272-1478. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jennifer Boyd  
March 17, 2004



**Ula C. Ruddock**  
Primary Examiner  
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